

ASIA-PACIFIC FISHERY COMMISSION

Report of the

AD HOC WORKING GROUP OF EXPERTS IN RURAL AQUACULTURE

Bangkok, Thailand, 20-22 October 1999



Food
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Rome, 1999

This One



2REJ-QK2-QK29

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ISBN 92-5-104396-5

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PREPARATION OF THIS DOCUMENT

The *Ad Hoc* Working Group of Experts in Rural Aquaculture was formed on the recommendation of the twenty-sixth session of the Asia-Pacific Fishery Commission, held in Beijing, People's Republic of China, from 24 to 30 September 1998. This is the final version of the report of its meeting in Bangkok, Thailand, 20-22 October 1999, prepared with the assistance of Mr Peter Edwards.

Asia-Pacific Fishery Commission.

Report of the *Ad Hoc* Working Group of Experts in Rural Aquaculture. Bangkok, Thailand, 20-22 October 1999.

FAO Fisheries Report. No. 610. Rome, FAO. 1999. 22p.

ABSTRACT

This is the report of the meeting of the *Ad Hoc* Working Group of Experts in Rural Aquaculture of the Asia-Pacific Fishery Commission held in Bangkok, Thailand from 20 to 22 October 1999. Rural aquaculture contributes to the improvement of the livelihoods of the poor and to food security in areas where it is traditional practice. It has significant unfulfilled potential, particularly in areas where wild fish have declined recently with a widening gap between supply and demand of fish. Generic technologies exist for rural aquaculture so major constraints to its expansion are social and institutional. Poor farming households need to be specifically targeted and provided with institutional support to enable them to farm fish, although, for rural aquaculture to be sustainable, it has eventually to function as a private sector activity. An analytical framework is required to learn from past experience as there has been limited multiplier effect of successful projects. The establishment of regional networks would accelerate the contribution of aquaculture to rural development.

Distribution:

Members of the Asia-Pacific
Fishery Commission
Members of the Working Group
Other interested international organizations
FAO Fisheries Department
FAO Regional Fishery Officers

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OPENING OF THE MEETING

1. The Asia-Pacific Fishery Commission (APFIC) *Ad Hoc* Working Group of Experts in Rural Aquaculture, which comprises experts from nine countries (Bangladesh, China (People's Republic of), India, Indonesia, Nepal, Philippines, Sri Lanka, Thailand and Vietnam) and five regional/international organizations (AIT, FAO, ICLARM, IIRR and NACA) in the Asian region, was convened from 20 to 22 October 1999 at the FAO Regional Office for Asia and the Pacific (RAP), Bangkok. The list of members and participants who attended the meeting is attached as Appendix B. The Agenda, the List of Documents prepared by the members and the Terms of Reference of the Working Group are reproduced as Appendixes A, C and D respectively.

2. The APFIC Secretary, Mr. Veravat Hongkul, welcomed the members and the observers to the Session on behalf of the Assistant Director General of FAO, Mr. Prem Nath. He stressed that the Session represented a step forward from the FAO/NACA Expert Consultation on Sustainable Aquaculture for Rural Development held in March 1999 in Chiang Rai, Thailand. He informed the Working Group that food security is given high emphasis by FAO and asked what should be done for aquaculture to fulfil its potential towards ensuring that there is enough food for all. He pointed out that some countries such as the People's Republic of China have great experience in rural aquaculture but that for most countries it is a neglected although traditional activity. He cited the major developments of fisheries in Thailand: unsustainable marine fisheries in the 60s and 70s, followed by rapid expansion of shrimp culture in the 80s and 90s associated with mangrove and habitat destruction. The APFIC Secretary observed that we appear to be coming back full circle by exploring how traditional aquaculture might contribute more fully to improving the livelihoods of poor farming households and national food security. He mentioned His Majesty The King of Thailand's "New Theory" which is based on farming households developing self sufficiency through farming rather than export-oriented activities, but with surplus produce, including fish, marketed. Mr. Hongkul called for the establishment of a framework for rural aquaculture to contribute towards sustainable development; and for recommendations for specific tasks which could be implemented to contribute towards the above goals.

3. In his opening address, the Technical Secretary of the Working Group, Mr. Ziad Shehadeh, welcomed the members and participants on behalf of the Director General of FAO, Mr. Jacques Diouf. He explained that most of the members of the Working Group had been selected from experts who had participated in the FAO/NACA Expert Consultation to promote coordination in the region, to build on previous work and to avoid wasting resources. The Technical Secretary reiterated that this meeting be viewed as a follow up to the recent FAO/NACA Consultation. Mr. Shehadeh informed the Working Group that the eradication of food insecurity and rural poverty is a key objective of the FAO and the necessary commitments objectives and actions to achieve this goal are elaborated in the World Food Summit Action Plan. He noted that new approaches to research and development are being evolved with broad-based stakeholder involvement at all levels, especially at local level, in project design and implementation with emphasis on poor households and communities and empowerment of women. For these new approaches to be converted into practical strategies for action, Mr. Shehadeh stressed the need for corresponding changes at the policy and institutional levels. These principles are imbedded in the concept paper for the proposed regional programme on Aquaculture for Sustainable Rural Livelihood Development (ASRLD) which was presented during the meeting. In closing, he asked the Working Group to review the contribution of small-scale aquaculture to rural development; to identify opportunities and constraints to rural aquaculture; and to arrive at conclusions and recommendations to be raised to the APFIC at its next meeting.

OVERVIEW OF RURAL AQUACULTURE

4. The Working Group discussed the scope and objectives of rural aquaculture, including enhanced fisheries. The main aims of rural aquaculture: to improve the livelihoods of the rural poor and to promote food security in rural areas, were noted. It was agreed that both producers and consumers should be considered, and some members felt that the latter should include also poor urban consumers. Rural aquaculture has been defined previously mainly with reference to small-scale households using low-cost extensive and semi-intensive husbandry for household consumption and/or income. To indicate the various ways in which aquaculture helps to alleviate poverty, a broader definition of rural aquaculture without reference to intensity of culture was proposed for purposes of the meeting: rural aquaculture contributes to the alleviation of poverty directly through small-scale household farming of aquatic organisms for domestic consumption and/or income; or indirectly through employment of the poor as service providers to aquaculture, as workers on aquatic farms of better-off farmers, and/or by providing low-cost fish for poor rural and urban consumers.
5. The Group further noted that poverty alleviation is a complex task and requires action expressed through wide ranging policy initiatives aimed at the rural poor. In this context, aquaculture can contribute significantly to livelihoods of the rural poor if mediating institutions operate equitably. There is need to raise the awareness of policy makers and planners of the potential that aquaculture holds in rural development and to encourage its incorporation into rural development schemes. The documentation of successful approaches and methodologies, lessons learned, etc. at all levels: policy, institutions, communities, farms, etc. would help in this process.
6. It was recognized that the contribution of rural aquaculture to development in the region is uneven. The People's Republic of China farms more than 60 percent of the total regional production; and over the past decade inland aquaculture production in the People's Republic of China has increased about five times, whereas it has only doubled in the rest of the world. This suggests significant unfulfilled potential if constraints to its further development were addressed.
7. Poor households farm fish in areas of Asia where it is traditional practice. There is also a wide range of opportunities to integrate aquaculture within existing farming systems in countries with and without a tradition in aquaculture. As wild fish stocks are threatened by overfishing and environmental degradation, aquaculture is increasingly perceived by households to be an attractive option to provide food and income to diversify their livelihood strategies. The Working Group noted, however, that poor farming households require extensive and extended institutional support to adopt aquaculture; though aquaculture has eventually to function as a private sector activity without government or project support if it is to be sustainable.
8. Diverse generic technologies exist for rural aquaculture: land-based systems such as rice/fish and pond culture, and water-based systems such as enhanced fisheries and cage culture in inland areas, and in water-based systems involving culture of molluscs and seaweeds in coastal areas. Relatively low-value herbivorous fish cultured integrated with agriculture contribute most to rural aquaculture. However, it was noted that, in some cases, small-scale farmers are encouraged to culture high-value species when culture of lower value species is not profitable (e.g. culture of some carp species in the People's Republic of China). It has also been suggested that intensive cage culture may be one of the few options for the landless and poor fishers to benefit from aquaculture in inland water bodies and in coastal areas.
9. Knowledge is available, but extension of knowledge is a problem. The major constraints to rural aquaculture fulfilling its potential contribution to development are the limited knowledge and capacity of both farmers and service providers from extension workers to policy makers. There was a consensus in the Working Group that there is a need for more people-centred development. This requires a new professionalism of service providers to empower local communities and the poor. Enabling policy and

institutional frameworks are required, as well as greater use of a farming systems research and extension approach to assess grass roots' needs and resources, to identify and adapt technologies to local contexts, and to extend them widely to potential beneficiaries. This will require Departments of Fisheries to either develop increasing capacity in the social sciences to complement the current predominance of natural scientists, or to acquire it by forging partnerships with national institutions.

10. There was considerable debate on the contribution of rural aquaculture to the total aquaculture production in the region and the extent to which the poor benefit. All countries have large unfulfilled potential for growth although rural aquaculture is far better developed in countries such as the People's Republic of China and India, than in Bangladesh, Nepal, Philippines and Sri Lanka. In the People's Republic of China where significant expansion and intensification of aquaculture are taking place, there is dichotomy of culture practice: more intensive systems based increasingly on formulated feeds are more common in coastal provinces (although in Jiangsu more than 60 percent of production is from small-scale farms with average pond size of $<400 \text{ m}^2$), while in poorer and remoter provinces traditional integrated systems based mainly on manuring still predominate. Almost all Indian aquaculture may be considered as rural aquaculture with extensive to semi-intensive modes of production in ponds (tanks) ranging in size from 0.1 to 2-3 ha. In the Philippines, small-scale holders dominate coastal seaweed and mollusc farming.

12. Rural aquaculture provides numerous benefits and is becoming increasingly recognized as an entry point to improve the livelihoods of the poor. Direct benefits include: the provision of high nutritional value food, especially for vulnerable groups such as pregnant and lactating women, infants and pre-school children; employment through farming; and income through sale of relatively high value produce. A range of indirect benefits of aquaculture to the poor include: increased availability of low-cost fish in local markets; employment on larger farms, in seed distribution networks, in manufacture/repair and in market chains; increased farm sustainability through construction of ponds which serve as small-scale on-farm reservoirs, and stocking fish in rice fields which leads to reduced pesticide use. It was reported that the traditional integrated farming system in Vietnam involving fish culture may contribute as much to household income as rice cultivation, while occupying a much smaller area. However, it was reported that some poor farmers in Cambodia and Bangladesh cannot afford to eat their harvested fish as they need to sell them to earn cash.

13. The limited documentary evidence that aquaculture helps to reduce poverty was discussed. The poor information base is due to the small-scale and geographically scattered nature of aquaculture carried out by poor farming households; also much produce is consumed domestically or is sold on local markets and fails to be recorded by governments in their collection of statistics. Furthermore, the poor have rarely been explicitly identified and targeted for assistance through projects or programmes. The Group underlined the need to improve the information base to facilitate policy formulation and development planning.

14. Although aquaculture contributes significantly to alleviating poverty in societies in which it is traditional practice, a series of predisposing conditions may be required for new entrant, poor farming households to adopt aquaculture, especially in areas where aquaculture has been introduced recently: appreciation of fish as food and / or to generate income ; access to land (land-based systems) or a water body (water-based systems); familiarity with appropriate technology; availability of seed; and institutional support, the need for which is being directly proportional to the intensity of culture and use of off-farm inputs.

Government policy

15. The Working Group noted that most Governments in the region have policies that reflect the importance of rural aquaculture in meeting basic human needs, increasing social equity and contributing to food security. However, the Group recognized an implementation gap in several countries, a lack of an enabling environment to translate favourable policy into action based programmes.

16. It was recognized that rural aquaculture is largely in an experimental phase in several countries and thus too new to have had a major impact on the implementation of policy. Sri Lanka provides an example of the importance of government policy to support rural aquaculture as an attempt to privatize aquaculture leasing of government fisheries stations to the private sector for production of ornamental fish led to a sharp drop in fish production, largely because fingerling production supply had remained entirely in the government sector. In Viet Nam, the Government initially emphasized only intensive aquaculture for export but changed its policy to favour also rural aquaculture once success at grass roots had been demonstrated.

17. Diverse constraints to implementing government policy were discussed by the Group. These may include, *inter alia*, a lack of political will; limited long term development focus with emphasis on short term returns and attendant visibility (as can be realized from farming of intensive fish and shrimp which provide foreign exchange); a perception of the poor as wards of the state rather than contributors to national economic growth; the multiplicity of agencies that regulate various facets of rural aquaculture; and the lack of inter-agency collaborative mechanisms.

18. In some countries, legislation on use of natural resources (land and water), which usually favour agriculture, often impede the development of rural aquaculture or fail to address its needs. For example, in Nepal water cannot be diverted from irrigation projects for fisheries, or if it is pumped to ponds the cost of electricity is increased; Sri Lanka is currently drafting legislation to resolve conflicts in overlapping use of land and water as aquaculture is often neglected in favour of agriculture; several countries in the region (e.g. Indonesia and Vietnam) prohibited the conversion of rice fields to fish ponds due to emphasis on grain for food security, but laws have been subsequently relaxed to varying degrees.

19. A major constraint discussed by members is the technocratic and zoological mind-set of most officials in relevant Government institutions in providing adequate support: commodity focus rather than community and household welfare; high-value species rather than low-cost food fish; and research to maximize biological yields rather than identifying and addressing people's needs. A paradigm shift is required in the minds of aquaculture service providers from "aquaculture development" to "aquaculture for development".

20. The Working Group noted the need for research to analyze the complex and diverse reasons why policy is not implemented in the countries of the region.

Technologies

21. The Working Group noted that although the development of technology is a dynamic and continuous process, generic technologies for rural aquaculture do exist. There was agreement that the social and economic aspects of technology are likely to be more important determinants in the expansion of rural aquaculture than technology *per se*.

22. Access to land or water is a prerequisite for rural aquaculture. This needs to be translated into secure tenure through national level policy and local-level government support. In Bangladesh it is Government policy to assist the landless to farm fish in water-based systems (cages, enhanced fisheries) in public water bodies. Poor fishers in Nepal have access to lakes and reservoirs to farm fish if they live around a water body and conduct aquaculture themselves.

23. Appropriate mechanisms to provide microcredit and minimize risk are needed to support adoption of aquaculture by the poor. Previously, it was difficult for small-scale farmers to obtain credit in Vietnam but two banks now provide up to US\$ 1,000 credit without collateral; revolving credit schemes for poor farmers are also being implemented through local level organizations and NGOs in Vietnam and Indonesia. In Bangladesh, NGOs similarly provide microcredit to the poor and landless; while larger farmers can obtain credit from banks, medium level farmers lack access to credit. It was pointed out that credit provided to small-scale farmers through projects usually has a low rate of return so it may be best to provide credit through formal lending systems, and preferably through traditional systems of credit. In the People's Republic of China, the Government promotes the culture of high value species for poor farmers; they are organised into groups and provided with financial as well as technical support as they lack resources and cannot afford to take risk. In Indonesia, members without capital, assisted through a system of community self-help (farmers groups), with initial capital from the government, later paid back to a revolving community fund.

24. The Working Group recognized the role of centralized government or donor funded hatcheries to provide an initial supply of seed for the development of aquaculture in new areas. However, strategies to promote decentralization and gradual privatization of seed production were recommended so that the benefits can be more widely distributed to a larger number of beneficiaries. Members reported that poor farmers in Jessore, Bangladesh and Northeast Thailand became affluent through operating hatcheries, a good example of aquaculture lifting households out of poverty. However, more importantly, decentralization of seed production considerably increases the availability of seed in rural areas to the benefit of larger numbers of farmers. Centralized government hatcheries can then concentrate on quality control of currently farmed species, as seed quality was reported to be declining in many countries, and research into breeding potentially new species for aquaculture.

25. The findings of a "Scoping Workshop on Primary Health Care in Rural Small-scale Aquaculture" were presented and discussed by the Working Group. Although disease usually starts in intensive, commercial farms, it can spread to small-scale farms. Epizootic ulcerative syndrome had a different etiology as it directly infected fish on all farms in the Indian Subcontinent. Disease of grass carp in small-scale farmer operated cages and ponds in Vietnam is a major problem.

Research and development

26. Conventional top-down, technology-driven approaches to research and development of rural aquaculture have had only marginal impact in most countries. The Working Group proposed that increased attention be given to participatory, farming systems research and extension (FSR&E). FSR&E approaches can be used: (i) to identify poor farming households as target groups in or near specific ecological and agroecological zones; (ii) to assess their needs and resources; (iii) to assess whether aquaculture is the most appropriate technological intervention or entry point to improve their livelihoods;

(iv) to develop and adapt technologies to local contexts through on-farm research; and (v) to develop appropriate extension media and identify extension channels to reach farmers. Appropriate “baskets” of choices of technological options, rather than fixed prescriptive technologies developed only through distant on-station research, may then be widely disseminated to potential beneficiary farmers.

27. The Working Group noted that extension is a critical “bottleneck”; both approach and content are often inappropriate. Constraints being faced by public sector extension were noted, in particular insufficient involvement of extensionists in participatory field research as reflected by inadequate feedback of farmers’ needs into research; and small and declining public sector budgets that can provide only a limited number of often inadequately trained and supported extensionists in the field. In some cases, general agriculture technicians with very little knowledge of aquaculture are providing aquaculture extension services. This is aggravated by the fact that aquaculture is often a secondary activity and technicians pay little attention to it.

28. Numerous innovative extension approaches need to be explored, particularly as the conventional approach in hiring more fisheries extension workers is not feasible with downsizing of government support in many countries. Different strategies for extension will be required for different contexts, with increasing emphasis on facilitating farmers experiential learning and farmer to farmer extension. The Working Group noted that much could be learned from recent developments and the considerably greater amount of experience in agricultural extension.

29. There was intense debate on whether poor households are able to adopt aquaculture as a new enterprise. It was reported that the poor are not early adopters when offered new technology, but middle-level (“progressive”) farmers with the time, resources and capacity to take risk in exploring and adapting new technology to their livelihood strategies. It was noted that if projects do not target a specific group (i.e. the poor), experience has shown that benefits tend to accrue to those who are already better off (e.g. trickle-down system in Bangladesh targets those with access to ponds and funds to invest in operating costs, in contrast to NGOs which target the landless and poorest farmers).

30. It was reported that some projects in Bangladesh, India and Vietnam directly target “progressive” farmers endowed with better resources rather than the poor to create an initial impact through the introduction of innovative aquaculture technology in a given locality. Some members of the Working Group questioned the possible relevance for the poor of technologies introduced for better-off farmers; and also the degree to which information is shared through a “trickle-down effect” from progressive farmers to poorer members of communities because of “intellectual property rights at grass roots level”. However, progressive farmers may share knowledge with poorer farming households because it increases their prestige in the local community.

31. The Group noted that, because of their marginal circumstances and aversion to risk, those who most need the benefits of a new idea are the last to adopt it. Therefore, identifying and dealing with the circumstances of poor farmers through participatory methods is critical to successful adoption. Experience from Bangladesh indicates that the poor are able to adopt new aquaculture technology if they are provided with a complete package of support that includes training and microcredit. Under these circumstances there may be greater potential for horizontal spread of technology to other poor farming households. The need for a continuous process of assistance was highlighted by the example of the Thai Government Village Fish Pond project which had limited success because of the absence of monitoring and follow-up assistance after implementation.

Resources and partnerships

32. It was recognized by the Working Group that for aquaculture to contribute to sustainable rural development, it eventually has to be economic and function as a private sector activity without technical

or financial support. The Group further recognized that it is primarily the responsibility of national governments to promote rural development through aquaculture although substantial technical and financial assistance will be required to eliminate poverty. Concerns were expressed about the long-term trend of reduced role of government and increased privatization, particularly in cases where functional alternatives are not yet available. The aim should be to demonstrate that rural aquaculture merits support as a productive and self-sustainable economic activity for the poor. However, the dilemma of an increased allocation of declining government resources to specifically target the poor, which would cost more than supporting other groups and activities, should be recognized.

33. The Working Group emphasized that developing the potential of aquaculture to contribute towards the elimination of poverty will be a long-term process. There is a need for a step-wise and staggered approach involving the use of pilot projects in various administrative and ecological/agroecological contexts. Policy should aim for relatively short-term support, where needed, with planned phase-out involving increasing private sector involvement. An example was provided from Nepal where 5-6 years of institutional support was required before the private sector became involved in lake-based cage culture.

34. The formation of partnerships between governments, non-government agencies (NGOs), donor-funded projects, regional organizations and the private sector was considered essential by the Working Group because of limited resources and the magnitude of the task. No single organization can have all the expertise from social and natural sciences. Governments could mobilize diverse requisite skills from within country to make better use of existing resources. While there are successful examples of partnerships such as the Philippines National Tilapia Breeding Program between government and the private sector, experience indicates that it is not easy to establish meaningful as opposed to contractual partnerships. Partners need to define, agree upon and regularly review purpose, linkages, activities, outputs and impact.

35. The Working Group discussed the complementary nature of NGOs and government organizations (GO). NGOs have pioneered field-based learning through involvement with communities at grass-roots level. NGO-GO partnerships would facilitate sharing of such experience which should influence policy and enable GOs to disseminate positive interventions more widely.

36. Members recognized that, in many instances, NGOs and donor funded projects have improved the livelihoods of the poor in small areas through intensive use of resources. However, it may be impractical to replicate such examples elsewhere on a more widespread scale; and they may even be unsustainable without continued institutional support which governments are usually unable to provide in a cost-effective way. Sometimes, NGO and donor funded projects may also unintentionally weaken rather than strengthen government capacity in rural aquaculture. Staff often leave government service because they are offered better terms of employment; and projects on completion often leave behind infrastructure which governments struggle to maintain.

SPECIAL ISSUES

37. Papers on identification of target groups and approaches and draft guidelines for assessing the impacts of rural aquaculture projects were presented and discussed.

38. It is essential to identify the poorer members of rural society who are most in need of assistance. The three main categories of potential beneficiaries for special assistance are the landless, small-scale farmers, and small-scale fishers from inland and coastal areas. The landless have usually been marginalized through green revolution agriculture in well endowed, lowland areas. Small-scale farmers mainly farm marginal agricultural areas in complex, diverse and risk prone, rainfed and hilly areas in hinterlands and areas of higher elevation. Many inland and coastal fishers are from the most impoverished

communities. Within each of the above groups, women and children may be particularly disadvantaged and warrant special consideration.

39. The Working Group discussed the complex task of defining poverty. It is increasingly recognized that poverty cannot be adequately defined by the conventional way of using various objective criteria and that the views of the poor themselves need to be considered through participatory approaches. Only through local-level diagnosis and consultation can their capabilities, resources and constraints be identified and addressed.

40. The Working Group recognized that rural aquaculture in most countries of the region is in an experimental phase and agreed on the need to analyze the impact of projects, failures as well as successes, for inclusion in feedback loops to influence policy and improve development planning. Although probably involving middle level farmers, examples of successful aquaculture development with limited government support were cited by members of the Group: small-scale carp hatcheries and nurseries in Bangladesh; and prawn and shrimp farming in India. The Group also discussed the apparent limited replication or multiplier effect of successful projects (e.g. the development of cage culture in the Pokhara valley of Nepal), and proposed analysis of such projects to identify the reasons for lack of wider application of successful results.

41. Rural aquaculture could benefit from the common methodology being developed for learning from coastal management projects which is being funded by UNDP. The objectives of this initiative are to develop and apply concepts and tools to facilitate analysis of different projects; to clarify conceptual frameworks upon which projects are based; to analyze hypotheses on how sustained progress is achieved; to better document impacts on societies and ecosystems; and to enhance local and national ownership and governance of project initiatives.

42. There was agreement on the need to develop an analytical framework to facilitate learning from case studies in the field. *Ex post* project evaluation is required to determine "lessons learned" and to compare *ex post* realization with *ex ante* estimates. Impact should be assessed at least 1-2 years after a project has finished to determine if benefits are sustainable without project support.

43. A three stage assessment framework is required that involves (i) clear identification of opportunities for aquaculture development in the target area, the target population and the potential for impact; (ii) adoption of technologies derived from or disseminated by the project leading to improved farm productivity; and (iii) improved welfare resulting from the project, with an assessment if benefits focus on the poor, address gender equity, and are sustainable without continued institutional support.

44. There is a need to develop a series of indicators to assess the impact of rural aquaculture projects. Ideally these should be precise, objective and quantitative, but more subjective and qualitative indicators may have to be used to measure changes in human behaviour and institutional development. A series of questions, for which indicators remain to be developed, were presented at the session concerning impact on ultimate beneficiaries at household and community levels, project approach, technology development, training, partnerships, dissemination of lessons learned and institutional sustainability.

REGIONAL COOPERATION

45. Regional networks provide an effective mechanism to handle diverse contexts within and between countries. Advantages include: capitalizing on "lessons learned" through exchanges of experience; economies of scale through cost sharing in carrying out activities; increased scale and coverage through obtaining greater resources; and providing entry points for agencies to buy into the network. Noting that the World Bank coordinated Study on International Fisheries Research (SIFR) recommended the

establishment of regional networks to promote aquaculture, the Group reviewed two recent initiatives towards this end in rural aquaculture and management of aquatic resources.

46. A regional programme concept on "Aquaculture for Sustainable Rural Livelihood Development" (ASRLD) has recently been formulated by FAO/NACA in follow up to a request by the NACA Governing Council and in response to the recommendation of the 1997 FAO/NACA "Survey and Analysis of Aquaculture Development and Research Capacities in Asia", that rural aquaculture be given high priority for regional aquaculture development research. The programme concept document benefited from an Expert Consultation in April 1999, attended by the majority of Working Group members, and a joint FAO/NACA Programme Formulation Mission which presented and discussed the concept with national governments (People's Republic of China, Bangladesh, India, Thailand and Vietnam) and several regional organizations.

47. The purpose of the ASRLD is to catalyze and promote the further development of small-scale rural aquaculture (as a component of rural development programmes aimed at poverty alleviation and improvement of food security) through a voluntary network of national institutions and field projects, and by building capacity and mobilizing information and expertise in the region. The Programme will build on the existing regional institutional structure and incorporate activities into the existing projects and programmes of participating national institutions. Its target groups include rural poor households, communities and local, national and regional institutions/organizations and their personnel.

48. The immediate objectives of the ASRLD are: (a) to develop the capacities of poor rural communities to participate in exploiting opportunities for aquaculture for rural development and assume ownership of the development process; (b) to strengthen the capabilities of local, national and regional institutions involved in: (i) policy making, (ii) technology development, dissemination and utilization and (iii) the provision of support services; (c) to promote the development, adaptation and use of appropriate aquaculture technology and management through an interdisciplinary and participatory problem-solving approach within the context of the overall farm-household system; and (d) to promote regional collaboration in small-scale aquaculture development as a component of rural livelihood development.

49. In responding to some members of the Working Group, who stressed that all interested countries should be given the opportunity to participate in the Programme, not only the major aquaculture producers, FAO and NACA staff confirmed that this is the intention and that the Programme is open to non-NACA members as well. Budgetary considerations prevented the Programme Formulation Mission from visiting all countries.

50. The Department for International Development (DFID), UK has recently launched a participatory preparation process for a possible regional programme in aquatic resources management in Southeast Asia. Over the past two decades, DFID has supported the development of appropriate technology to integrate aquaculture into local farming systems through research and outreach programmes at the Asian Institute of Technology; has funded research partnerships between UK and regional institutions on biological and social dimensions of capture fisheries in inland water bodies; and has funded a large and diverse development programme centred around fisheries management and aquaculture, particularly in Bangladesh. The general lessons derived from these various DFID funded efforts are that less intensive forms of aquaculture and harvest of wild fish can contribute significantly to the livelihoods of the rural poor, if mediating institutions operate equitably. As the major constraint to poor people benefiting from aquatic resources relates to failures in approaches to the extension of knowledge rather than to a lack of knowledge, DFID is seeking to re-orientate its support to address the constraint of failures in extension of knowledge to the poor. Detailed discussion of this programme was not possible due to the absence of the DFID representative. However, FAO and NACA staff pointed out that there is no problem of conflict or overlap between the two programmes since

national projects relevant to ASRLD, supported by the DFID programme, could join and enrich the network.

51. The Working Group endorsed the ASRLD as a timely mechanism for regional cooperation on aquaculture in rural development and requested that highest priority be given, in the Group's recommendations, to its support and endorsement by APFIC Members, donors and FAO.

MAIN CONCLUSIONS

52. In consolidating its discussions, the Working Group arrived at a number of conclusions relevant to its terms of reference. They are listed below.

53. Aquaculture in the region developed mainly as a rural activity integrated into existing farming systems. The sector has made significant contributions towards the alleviation of poverty and food insecurity in poor rural societies in the past, particularly in countries where it is a traditional practice. Recent experiences in these countries indicate that there are wide opportunities for the poor to integrate aquaculture within existing farming systems, and that poor farmers can be early adopters of aquaculture where there are enabling conditions. Realizing that small-scale aquaculture can contribute to food security, poverty alleviation and improved livelihoods for rural populations, many Governments in the Asia-Pacific region as well as development agencies are giving importance to the development of this sector.

54. Although there is agreement on the significance of aquaculture in improving food security and alleviating poverty, it is difficult to quantify its contributions because of its dispersed nature. This is because most produce is consumed domestically and does not feed into main market channels, and the lack of reliable indicators of its social and economic contributions to rural welfare. There are also few empirical data to assess impact of research and development projects.

55. In countries where it is neither a traditional nor widespread practice, aquaculture could contribute significantly to rural development with adequate institutional support. This would be facilitated by application of new research and development approaches and methodologies and lessons learned from their application elsewhere.

56. The alleviation of poverty is the responsibility of governments. This is a complex process that calls for a policy environment and mechanisms that would help stimulate growth (e.g. through investment in human capital, provision of appropriate legislation, technology, resources, credit facilities and markets), rather than focusing on short-term needs. New approaches and methods to research and development have emerged in response to constraints at the field level, but there is need for corresponding changes at the policy level which should be reflected in institutional reforms.

57. Although some governments have the policies for the incorporation of aquaculture into rural development plans, policy measures are not always adequately translated into action programmes. Also, limited multiplier effect has been obtained from some successful projects in the region. Several factors may be responsible, including: the multiplicity of institutions involved in use of natural resources, lack of legislation specific to aquaculture, inadequate knowledge of aquaculture in related sectors, etc.

58. There is a lack of research directed towards identifying the constraints to the implementation of Government policies on rural aquaculture research and development as well as the constraints to the adoption of aquaculture by poor households.

59. Small-scale rural aquaculture is usually one component of a farming system. Accordingly, its impact can be increased by wider application of integrated agriculture-aquaculture farming methods,

which are traditional in many countries of the region, and by promoting this integration at the policy and institutional levels.

60. The role of Governments in development is changing and small-scale rural aquaculture has to function ultimately with minimum government intervention if it is to be sustainable. However, government or external support to poor farmers is still required in the foreseeable future in most countries, though alternative mechanisms need to be defined and tested for the provision of this support.

61. In most countries, several organizations/agencies are involved in the implementation of rural aquaculture programmes with little or no coordination. The roles of various stakeholders are often not defined and government strategies for partnerships with the stakeholders are either lacking or unclear. This reduces the efficacy of the research and development process and the impact of R & D efforts.

62. Due to the complexity of addressing rural poverty, the research and development process will, of necessity, require a long-term stepwise strategy, with the level of external assistance required by farmers inversely proportional to their resources and capabilities.

63. Often, target group selection is done without proper involvement of the stakeholders and consideration of all the relevant variables. Small-scale projects aimed at the poor often benefit the more "progressive farmers" in a community, with reduced or little benefit to the targeted group.

64. Although appropriate technologies are available for small-scale rural aquaculture, there is a need for adaptive research using farming systems research and extension methods to provide a sound basis for development. There is also need to ensure farmers' access to information, training opportunities, credit, seed, feed, other supplies and markets and other services.

65. The current dependence, in many Asian countries, on centralized government hatcheries is not favourable to sustained long-term development. The role of Government hatcheries, and the benefits of centralized versus decentralized hatcheries require re-evaluation.

66. Current extension systems in a changing world of increasingly limited resources often cannot meet the development needs of rural aquaculture; thus alternative approaches may be required.

67. Government programmes and projects often are inadequately evaluated and the results are rarely disseminated. Moreover, the methodology for assessing the impacts of rural aquaculture projects is only partially developed and used and assessment is not standardized in a way that allows comparison.

68. Many of the problems of small-scale rural aquaculture are similar to and are being addressed more extensively by the agriculture sector. Aquaculture should benefit from these experiences. However, in most countries there are few functional synergies between the two disciplines.

RECOMMENDATIONS

69. The Working Group formulated the following recommendations on the basis of the above conclusions. The recommendations are targeted at the institutions in brackets, with highest priority given to follow up on the ASRLD programme. The recommendations are listed below.

70. Adjustments should be made at the policy and institutional levels, where appropriate, to accommodate and respond more effectively to new research and development approaches and methods in rural aquaculture development (*FAO, APFIC members*).

71. Policy research should be supported, where appropriate, to explain (a) why policy measures are not always adequately translated into action programmes, and (b) the lack of multiplier effect from successful field projects (*APFIC members/APFIC, donors, FAO*).
72. Efforts should be made to increase the awareness of policy makers and planners of the diversity of available integrated agriculture-aquaculture systems and their potential impact in order to facilitate integration of agriculture with aquaculture at the policy and institutional levels. (*FAO and APFIC members*).
73. Closer interaction between and amongst agriculture and aquaculture development agencies (and other related agencies) should be established to encourage integrated planning and capitalize on potential synergies. This could be fostered through the establishment of national coordination committees. (*APFIC members*)
74. Governments should explore alternative mechanisms for the provision of external services to poor farmers and define the roles of various stakeholders and potential partners (*APFIC members, APFIC*).
75. The impact of field projects on people's welfare and the environment should be continuously evaluated to assist policy makers and planners, and help identify sustainability factors. Reliable analytical frameworks, which include pre- and post-project analysis, should be developed and used for this purpose. (*APFIC members, FAO and other relevant organizations*)
76. Indicators should be developed to enable a more precise assessment of the impact of rural aquaculture on household and community welfare. (*FAO and relevant organizations*)
77. Adaptive research should be done in the various ecological and agroecological zones, paying particular attention to target group identification using participatory approaches. Member countries are encouraged to conduct pilot projects for this purpose. (*APFIC member countries, donors*).
78. Particularly when considering the lowest income groups as beneficiaries, technological or input support should not be given in isolation but rather should be accompanied by comprehensive assistance, such as access to training, information, resources, infrastructure, markets, etc. (*APFIC members, donors*).
79. Seed production should be gradually decentralized and involvement of the private sector encouraged. A limited number of Government seed production centres should be maintained for research, domestication or development of new species, and broodstock management to serve national needs (*APFIC members*).
80. Alternative extension strategies for rural aquaculture need to be developed, including extension materials and channels. Particular attention should be focused on methods for raising farmer capacity, farmer to farmer extension, targeting extension on different ecological and agroecological zones, appropriate training and extension materials and the improved use of media. (*FAO, APFIC members, donors, relevant institutions*).
81. Research should address the role of aquaculture in household economics (i.e. contribution to household livelihood and use of productive resources) in comparison with alternative farm enterprises, including off-farm sources of income in different ecological and agroecological zones. (*FAO, donors, regional and other relevant organizations*)
82. Regional Cooperation among countries and donors, incorporating a TCDC element, should be pursued and supported to facilitate development in this sector. The proposed NACA-FAO regional programme on Sustainable Aquaculture for Rural Livelihood Development (ASRLD) is a suitable vehicle

for this purpose and APFIC members are urged to support it, including a TCP request to FAO for its establishment. *(APFIC members, FAO, NACA, SEAFDEC, MRC, donors)*

83. An organized information base on small-scale rural aquaculture should be developed and established to incorporate and provide easy access to data on existing knowledge (including traditional knowledge), literature, national policies, on-going programmes, project experiences, existing human capacity, etc. to facilitate research and development. *(FAO, regional organizations, donors, other concerned institutions)*

84. Codes of Practice for rural aquaculture should be developed to help guide planning, research and development. *(FAO, regional and other relevant organization, donors)*

ADOPTION OF CONCLUSIONS AND RECOMMENDATIONS

85. The members reviewed and adopted the main conclusions and recommendations with some modifications. The group stressed two main issues in the course of the review: the reasons why policy measures are not always adequately translated into action programmes should be researched and addressed; and the role of governments in production and distribution of seed should be gradually reduced with increased attention given to seed quality and breeding new species.

FOCUS, DATE AND VENUE OF NEXT MEETING

86. The Working Group agreed that the next meeting should address a specific topic in detail as this session comprised a very broad overview of rural aquaculture. The membership of the next session would change as it would be composed of specific subject matter experts.

87. Five possible topics were considered : (a) seed production strategies for aquaculture and enhanced fisheries, including institutional frameworks (b) integrated agriculture – aquaculture systems (including rice-fish, livestock-fish and integration with irrigation systems), with emphasis on reasons for their limited adoption and dissemination despite strong traditions in countries such as the People's Republic of China and Vietnam (c) an analytical framework for and successful case studies on rural aquaculture (d) and aquaculture extension.

88. It was decided that a session on integrated agriculture – aquaculture systems would be convened, possibly with a narrower subject matter focus (e.g. rice-fish culture with emphasis on recent approaches) in two years or earlier if budgetary funds can be identified for this purpose. Since the topic of strategies for seed production drew almost equal interest, the Group suggested that consideration be given to covering both topics in the next meeting.

89. It was also suggested that FAO prepare an analytical framework to assess the impact of small scale rural aquaculture projects through its Regular Programme activities.

APPENDIX A

AGENDA AND TIMETABLE

Wednesday, 20 October 1999

Morning session

Registration and opening

08:30-09:00	Registration of participants
09:00-09:15	<ul style="list-style-type: none"> • Welcome speech by the APFIC Secretary, Dr. Veravat Hongskul • Address by the Technical Secretary of the <i>Ad hoc</i> Working Group, Dr. Ziad Shehadeh
09:15-09:30	Adoption of the Agenda
09:30-09:45	Coffee/tea break

Session 1. Overview of rural aquaculture

09:45-11:00	<ul style="list-style-type: none"> • Towards increased impact of rural aquaculture: Dr. Peter Edwards • Discussion
11:00-12:30	<ul style="list-style-type: none"> • The FAO-NACA Consultation on Sustainable Aquaculture for Rural development - a synthesis of presentations: Mr. Pete Bueno (invited speaker, NACA) • Discussion
12:30-14:00	Lunch Break

Afternoon session

Session 2. National reviews of development experience in rural aquaculture

	Presentations:
14:00-15:30	<ul style="list-style-type: none"> • Bangladesh: Mr. N. Islam • People's Republic of China: Dr. C. Jiaxin • India: Mr. Y.S. Yadava
15:30-15:45	Coffee/tea break

15:45-17:00

- Indonesia: Dr. Purwanto
- Nepal: Dr. D.B. Swar
- Philippines: Dr. M.M. Tayamen

Thursday, 21 October 1999

Morning session

Session 2. (Continued)

09:00-10:30

- Sri Lanka: Mr. A.M. Jayasekara
- Thailand: Dr. C. Virapat
- Vietnam: Dr. L.T. Luu

10:30-10:45

Coffee/tea break

10:45-11:15

Continuation of national reviews

Session 3. Plenary discussion of selected issues

Topic:

11:15-12:30

- **Main constraints to the contribution of aquaculture to rural development, in the light of recent field experience, and possible approaches to their resolution.**
- Recommendations to APFIC/donors.

12:30-14:00

Lunch break

Afternoon session

14:00-15:30

- **Documentation of (research and development) project experience at national and regional level as an aid to planning – how and what to collect; how to assess; how to compare projects; need for a common format; etc.**

Supporting documents:

- **Draft guidelines for the assessment of rural aquaculture projects:** Dr. P. Edwards
- **Approaches, methods and indicators for assessing the impact of small-scale rural aquaculture projects for poverty alleviation and food security:** Dr. M.V. Gupta

15:30-15:45

Coffee/tea break

15:45- 17:00

- Identification of target groups : approaches and implications
- Recommendations to APFIC/donors

Supporting documents:

- Identification of target groups: Dr. D. Kumar

Friday, 22 October 1999*Morning session***Session 4: Regional cooperation in rural aquaculture**

09:00-12:30

New Initiatives:

- Sustainable Aquaculture for Rural Livelihood Development (SARLD) programme concept – a regional programme concept: Dr. D. Kumar
- Findings of SARLD formulation mission & developments to date: Dr. L.T. Luu/Dr. D. Kumar
- DFID Aquatic Resource Management Programme: SE Asia

Discussion

- Strengthening regional collaboration in rural aquaculture; possible approaches and mechanisms (role of SARLD; APFIC WG; others; informal and practical mechanisms for consultation/cooperation; identification of useful activities at regional level; etc.)
- Recommendations to APFIC/donors/regional institutions/programmes

10:30-10:45

Coffee/tea break

12:30-14:00

Lunch Break

*Afternoon session***Session 5: Second meeting of the Working group**

14:00-15:30

- Subject matter of next meeting
- Intersessional activities

15.45-17:00

- Conclusions and recommendations
- Closing of meeting

APPENDIX B

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LIST OF DOCUMENTS

<i>Afternoon session</i> DISCUSSION PAPERS	
APFIC/WGRA/99/2	Towards Increased Impact of Rural Aquaculture
APFIC/WGRA/99/3	Approaches, Methods and Indicators for Assessing the Impact of Small-scale Rural Aquaculture Projects for Poverty and Food Security
APFIC/WGRA/99/4	Draft Guidelines for the Assessment of Rural Aquaculture Projects
APFIC/WGRA/99/5	Identification of Target Groups: Approaches and implications

APFIC/WGRA/99/CR 1	Country Report - Bangladesh
APFIC/WGRA/99/CR 2	Country Report – People's Republic of China
APFIC/WGRA/99/CR 3	Country Report - India
APFIC/WGRA/99/CR 4	Country Report - Indonesia
APFIC/WGRA/99/CR 5	Country Report - Nepal
APFIC/WGRA/99/CR 6	Country Report - Philippines
APFIC/WGRA/99/CR 7	Country Report – Sri Lanka
APFIC/WGRA/99/CR 8	Country Report - Thailand
APFIC/WGRA/99/CR 9	Country Report - Vietnam

APFIC/WGRA/99/Inf. 1	Provisional List of Documents
APFIC/WGRA/99/Inf. 2	Provisional of Participants

- APFIC/WGRA/99/Inf. 3 Small-scale Aquaculture in Rural Development: Status, directions and lessons (Synthesis of presentations at the FAO/NACA Consultations on Sustainable Aquaculture for Rural Development)
- APFIC/WGRA/99/Inf. 4 Draft Report of the FAO-NACA Consultation on Sustainable Aquaculture for Rural Development
- APFIC/WGRA/99/Inf. 5 Programme Document: Aquaculture for Sustainable Rural Livelihood Development (ASRLD)
- APFIC/WGRA/99/Inf. 6 Draft Report: FAO/NACA Mission for the Formulation of Regional Programme on Aquaculture for Sustainable Rural Livelihood Development (ASRLD)

APPENDIX D
TERMS OF REFERENCE OF THE WORKING GROUP

The functions of the Working Group shall be:

- (a) To review the contribution of aquaculture and inland fisheries in rural food security through the supply of food fish and generation of employment;
- (b) To determine the potential for and constraints to the further development of aquaculture for increasing their contribution to the achievement of rural food security;
- (c) To identify specific pilot projects in member countries to demonstrate sustainable contribution of small-scale aquaculture and/or stock enhancement of small waterbodies to rural food security; and
- (d) To report and advise APFIC on issues concerning the use of small-scale aquaculture for achieving rural food security.

This is the report of the first meeting of the Ad Hoc Working Group of Experts in Rural Aquaculture of the Asia-Pacific Fishery Commission held in Bangkok, Thailand from 20 to 22 October 1999. Rural aquaculture contributes to the improvement of the livelihoods of the poor and to food security in areas where it is traditional practice. It has significant unfulfilled potential, particularly in areas where wild fish have declined recently with a widening gap between supply and demand of fish. Generic technologies exist for rural aquaculture so major constraints to its expansion are social and institutional. Poor farming households need to be specifically targeted and provided with institutional support to enable them to farm fish, although, for rural aquaculture to be sustainable, it has eventually to function as a private sector activity. An analytical framework is required to learn from past experience as there has been a limited multiplier effect of successful projects. The establishment of regional networks would accelerate the contribution of aquaculture to rural development.

